Colvin Run Mill Historic Site
Museum Education Learning Kit
Grades 2 through 6

September through December
and
March through June
Weekdays, except Tuesdays, 10am - noon

10017 Colvin Run Road
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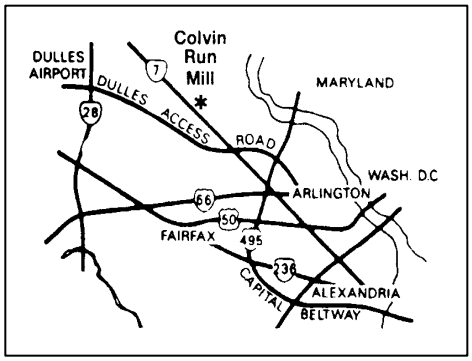
Fairfax County Park Authority
2001

Introduction

Thank you for scheduling a field trip to Colvin Run Mill Historic Site. We hope that you and your students find your visit to be both educational and enjoyable. This resource packet provides you with information to introduce your students to the site and to reinforce concepts learned during your visit. The Learning Kit includes Standards of Learning objectives, educational themes, a brief history of the site and a time line, a list of vocabulary words, worksheets and activities. Please feel free to adapt these materials to your needs and to make copies of this information.

Directions

Colvin Run Mill Historic Site is located on Colvin Run Road, seven miles west of Capital Beltway (Interstate 495) exit 47A, just off Leesburg Pike (State Route 7) in Great Falls, Virginia.



About your field trip to Colvin Run Mill Historic Site

Your tour of Colvin Run Mill Historic Site is scheduled to begin at 10am and will take about two hours to complete. Please refer to your confirmation form to determine the number of groups into which your students should be divided prior to your arrival. Please have your students wear clearly visible nametags so that the docents may address them by name. Children should wear comfortable shoes and clothing appropriate to the weather since they will walk outdoors between buildings and the mill is unheated.

If you have any questions or comments about the museum education program, the materials found in the Learning Kit or any other aspect of your upcoming field trip, please call the site office any day between the hours of 8:30am and 5:00pm at 703/759-2771.

Your students will visit three learning centers where they will discover the interdependence of local rural economics, the impact of geography on the development of communities in northern Virginia and the importance of transportation routes for commerce. They will also learn how simple machines made the miller's job easier, and they will experience some simple machines in action.

- In the ***mill***, students learn how grain was ground into flour or cornmeal by the water-powered grinding stones and discover the daily duties of the miller and his helpers.

- In the c. 1900 ***general store***, the class discovers not only a thriving commercial center for the town, but a hub of social activities as well. Students practice their math skills when they purchase items where their great-grandparents might have shopped.

- In the ***barn***, teachers may choose from two programs:

  Simple Machines Program - Students learn about the simple machines that made work easier before electricity. They will participate in four activities using simple machines.

  Tool Program - Students learn about and try hand tools used in construction in the early 1800s.

Educational Objectives

The objectives and themes found below correspond with the History and Social Science Standards of Learning developed for Virginia's elementary students in grades 2 through 6.

- A community is a group of people with common interests, especially those living in the same area. The students will learn that in the 19th century a vital rural community of farmers, craftspeople and merchants grew up around Colvin Run Mill. **2.2, 2.7, 4.1, 4.5**

- The vitality of the rural community at Colvin Run began to wane in the early 20th century as technological advances altered the patterns of the past. The students will learn about the economic and social transition faced by residents as their community began to change from a rural agricultural society to a more industrialized urban society. **2.2, 4.1, 4.5, 5.6, 6.1, 6.2**

- In the 19th century, Colvin Run Mill was a merchant mill. The students will learn how producers (like the miller) used natural, human and capital resources to produce goods in the past. **2.6, 2.7, 4.2, 5.6**

- Geography and transportation routes determined the location of the mill along Colvin Run. The students will learn how these factors also influenced the location and growth of the 19th century community. **2.5, 4.1, 4.2, 5.6, 6.7**

- Colvin Run Mill operated commercially from about 1811 to the 1930s. The students will learn about the social and commercial lives of ordinary Virginians during the 19th century. **2.7, 4.3, 4.5, 5.6, 6.5**

Objectives relating to Force, Motion and Energy from the Science Standards of Learning include:

- Students will investigate and understand simple machines and their uses and see examples of simple machines at work that made the miller's job easier. **3.2, 4.2, 6.2**

Educational Themes

Community

A ***community*** is a group of people with common interests, especially those living in the same area. Primarily a rural, agricultural community, the Colvin Run community survived intact for over a century despite wars and recessions, technological advances and industrialization. While the mill at Colvin Run played a pivotal role within the community, the rich diversity of life in 19th century northern Virginia was represented by the many farmers, craftspeople and merchants who lived here.

Energy and technology

Energy is the capacity to do work. Basic energy sources — water, muscle, heat and wind power — have not changed since the beginning of time. What has changed is ***technology***, the ways and means these energy sources are utilized to perform work. Examples of 19th century technology interpreted at Colvin Run Mill are simple heating and lighting methods, simple machines and hand-powered tools, and the water-powered gristmill with its sophisticated system of gear-operated machinery.

A Brief History of Colvin Run Mill

Colvin Run Mill, Fairfax County's only remaining operational water-powered gristmill, stands as a tribute to the enterprising spirit of America's past. Long before the mill was an active commercial venture, the land on which it was built was associated with several famous Virginians. In August 1739, Colonel John Colville received grants totaling almost 10,000 acres in what would become Fairfax County. Shortly thereafter he sold much of this land grant to William Fairfax. When Fairfax died in 1753, a 275-acre parcel of this property along Difficult Run was conveyed to his son Bryan Fairfax. In 1760 or '61, George Washington purchased the Difficult Run tract from Bryan Fairfax.

Washington recognized the potential of Colvin Run as mill site. A plentiful water supply was available, abundant hardwood forests provided ample building material and the site was located on a major transportation route leading to market at the port of Alexandria. However, the pressing business of waging war and governing the new nation prevented Washington from acting on his plans for his property along Difficult Run.

Although it is unclear when Colvin Run Mill was completed or indeed who built it, in 1811 William Sheppard purchased 90 acres of Washington's 275-acre parcel from George Washington's heirs and immediately conveyed it, along with a standing mill, to Philip Carper. In 1813 Carper paid the first known taxes on flour and cornmeal produced here.

For more than a century, a series of merchant millers operated Colvin Run Mill. In contrast to custom millers who ground grain for individual orders, merchant millers bought and sold grain and flour to serve both local and foreign markets. Grain products from Colvin Run Mill were exported through the port of Alexandria as well as marketed across northern Virginia via a network of improved roads.

A thriving village populated by farmers, craftspeople and merchants grew up with the mill as its center. Nineteenth century gazeteers and business directories refer to numerous blacksmith shops and country stores nearby. The c. 1900 Colvin Run General Store, once located across the road from the mill, has been refurbished as part of Colvin Run Mill Historic Site.

Although the mill operated for more than 120 years, its most prosperous period was 1883 to 1934 under the ownership of the Millard family who rebuilt the millrace and millpond and modernized the machinery. The greatest change was in the actual grinding process when a new roller mill — the latest in modern 19th century technology — was installed and proved to be more efficient than the old-fashioned revolving millstones. By 1930, it was estimated that over one million bushels of grain had been processed through Colvin Run Mill!

After 30 years of idleness and neglect, the Fairfax County Park Authority acquired the mill in 1965 and undertook its complete restoration. Because the building and machinery had undergone such fundamental change over its commercial life, Park Authority staff decided to base the restoration on the plans of Oliver Evans (1755-1819) whose innovations revolutionized milling in the early 19th century. When the derelict ruins of the mill were examined, they revealed a number of similarities to the floor plans and cross sections printed in Evans' 1795 book *The Young Millwright and Miller's Guide.*

Today's visitor sees the results of many skilled craftspeople who have, quite literally, recreated the past using traditional tools and skills. They repaired the structure, made the bricks and glass, hand-hewed timber to precise specifications and assembled the machinery. All the gears in the mill, with the exception of a few steel parts included for safety and convenience, have been handmade from wood. As in the early 19th century, the mill operates solely by water power. Water from Colvin Run is diverted into a pond and millrace and then flows over the 20' wooden overshot waterwheel to provide the power that turns the gears and operates the machinery.

Traditionally, the homes of great men and the sites of momentous events have been carefully preserved while the buildings used by ordinary people seldom survive. Colvin Run Mill has been restored to illustrate a time when wood and water performed important labor and communities prospered in support of such enterprise.

Colvin Run Mill Historic Site — Time Line

1700

1739 Colonel John Colville receives grants for 9,823 acres in what will become Fairfax County. He conveys a 275-acre tract along Difficult Run to William Fairfax.

1742 Fairfax County is created. John Colville and William Fairfax are
1750 appointed justices to the County Court.

1753 William Fairfax dies and his Difficult Run land is inherited by his son Bryan.

1760-61 Bryan Fairfax sells this property to George Washington.

1769-85 Washington constructs two mill seats on his land.

1781 The American Revolution ends.

1787 Oliver Evans designs the revolutionary automated gristmill.

1798 Fairfax County boundaries are redrawn.

1799 George Washington dies.

1800

1802-11 Colvin Run Mill is built.

1818 Leesburg/Alexandria Turnpike Company is chartered.

1820 Philip Carper's family appears on the Fairfax County census. He is the first documented owner of the mill on Colvin Run.

1840 Leesburg/Alexandria Turnpike is complete.

1840-60 New trades and services develop near the mill including a blacksmith shop and general store.

1842 Philip Carper sells the mill to John Powell.

1850

1861-65 During the Civil War foraging Union and Confederate troops deplete area harvests. The merchant milling business grinds to a halt.

1872 John Powell files for bankruptcy.

1883 Addison Millard purchases the mill.

1898 Addison Millard dies. His widow Emma and their two sons Sam and Alfred continue to operate the mill.

1900

1900 Mark Cockrill owns a general store across the road from the mill.

1919 Emma Millard dies; Sam and Alfred continue their business as Millard Brothers.

1934 The Millard family sells the mill to Bernard Bailey.

1940 The Leesburg/Alexandria Turnpike (now Virginia Route 7) is relocated to the south side of the mill.

1950

1965 Fairfax County Park Authority acquires the mill site.

1968-72 The Park Authority restores the mill and miller's house and the general store is moved from its original location to its present site.

1972 Colvin Run Mill Historic Site opens to the public.

1997 The site celebrates its 25th anniversary.

1990

Colvin Run Mill "Think Link" Game

Directions

- Divide your class into two teams, A and B.
- Draw a "Think Link" game board, as shown below, on the chalkboard.
- Write the word list on the chalkboard next to the game board.
- Explain the following rules to the teams:

  - Teams A and B will take turns responding.
  - Play starts with the teacher choosing one word from the list and writing it in any blank space in the grid.
  - Team A then selects a word from the list and explains the link between its word and the first word. This word is then written in any space adjacent to the teacher's word. A link line is drawn between the two spaces and the team's name is written on the link line. NOTE: links can be made between any contiguous spaces, horizontally, vertically or diagonally.
  - Team B must link the last word mentioned with a new word from the list, write its link line and its team name on the link line.
  - The team with the most links wins.

Word List:

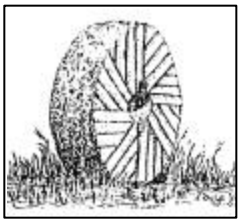
water
miller
flume
stone dresser
mill race
grain elevator
potbellied stove
stone crane
Colvin Run Mill millstones
community
barn
grain
general store
flour
scale
waterwheel
gear
farmer
dusty

Game adapted from *The Civil War Era: Teacher's Guide & Resource Pages for 5th Grade Social Studies*, Fairfax County Public Schools.

19th Century Livelihoods

Directions: Draw lines to match the words in each column with the pictures in the middle.

Storekeeper
A person who sells goods and provides services to customers.



Anvil
A heavy iron block on which heated metal is shaped.

Carpenter
A person who builds or repairs wooden structures.

General Store
A place where people came to buy supplies, get their mail, meet their neighbors and learn the news.

Blacksmith
A person who heats iron in a fire and shapes it into many useful items.

Millstones
Large round stones used for grinding grain.

Farmer
A person who raises crops or animals for sale.

Shaving horse
A bench with a foot-operated clamp to hold wood steady as it is shaped.

Miller
A person who grinds grain to make flour or corn meal.

Sickle
A cutting tool used to harvest grain that has a curved metal blade attached to a short handle.

Oliver Evans' Automated Mill: A Symphony of Simple Machines

Colvin Run Mill is filled with simple machines that accomplish important tasks to make the miller's job easier.

Lever: a stiff bar that moves on a turning point known as a fulcrum. Levers are used to operate the sluice gate, beam scale, and barrel packer, and to engage the gears and raise and lower the grinding stone.

Wheel and axle: a lever that spins in a circle, a wheel and axle lessen the force needed to lift or move a weight. Gears are wheels and axles with teeth that prevent slipping. Gears can be used to change the direction of the turning of an axle (i.e., the power from the greater and lesser face gears change direction via the wallower gears). Gears are also used to change force or speed. *Speed* is increased when a small gear is turned by a large one (greater face to wallower) and *force* is increased when a large gear is turned by a small one (wallower to lesser face).

Pulley: a single fixed pulley gives no increase of force, but simply changes direction. In the General Store, the windows are opened by a rope and pulley system — pulling down on the rope raises the window. Other examples in the mill are grain elevators, hopper boy counter-weights, and the rope and pulley assembly.

Inclined plane: a ramp or inclined plane makes it possible to climb gradually or control the speed or direction of descent. In the mill, the shoe controls the flow of grain falling into the grinding stones and the shaker assembly regulates the flow of flour or meal across the sifting screen. The stairs and chutes in the mill are other examples of inclined planes.

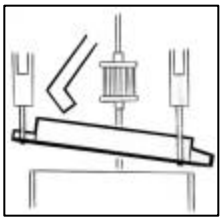
Wedge: a wedge can be either a form of inclined plane that forms a cutting edge or two inclined planes back-to-back whose sloping surfaces make the job a more gradual one. Nails are wedges, and the tapered point means you don't have to hammer as hard to drive the nail in. Hand tools like the broad axe, froe, draw knife and chisel are wedges with handles. The wooden garner fasteners and shims are other wedges found in the mill.

Screw: a screw is an inclined plane wrapped around a round form. Metal screws open the flume gates and raise the grinding stones and the wooden Archimedean screw moves flour through the bolting chest.

Simple Machines Make the Miller's Job Easier!

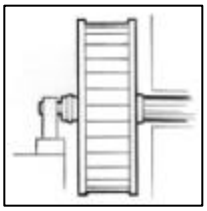
Directions: Draw lines to match the names and definitions with the simple machines pictured.

Pulley



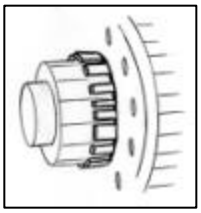
A rigid bar that turns around a fixed point that makes lifting easier.

Screw



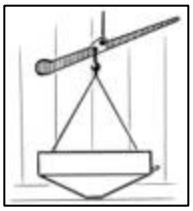
A solid block that is thick at one end and thin at the other and is used to secure or separate objects.

Lever



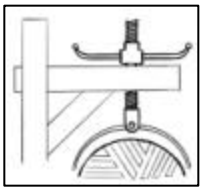
A device that spins in a circle and lessens the force needed to lift or move a weight.

Inclined plane



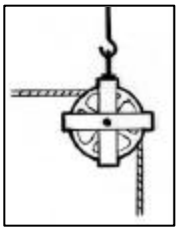
A tool that gives no increase of force, but changes direction — pulling down with this tool raises an object.

Wedge



An inclined plane wrapped around a round form.

Wheel & axle



A ramp that makes it possible to climb gradually or control the speed or direction of descent.

History Hunt

Directions: **Have your students answer the following questions and use the map on the following page to locate about some important places at Colvin Run Mill Historic Site.**

Questions:

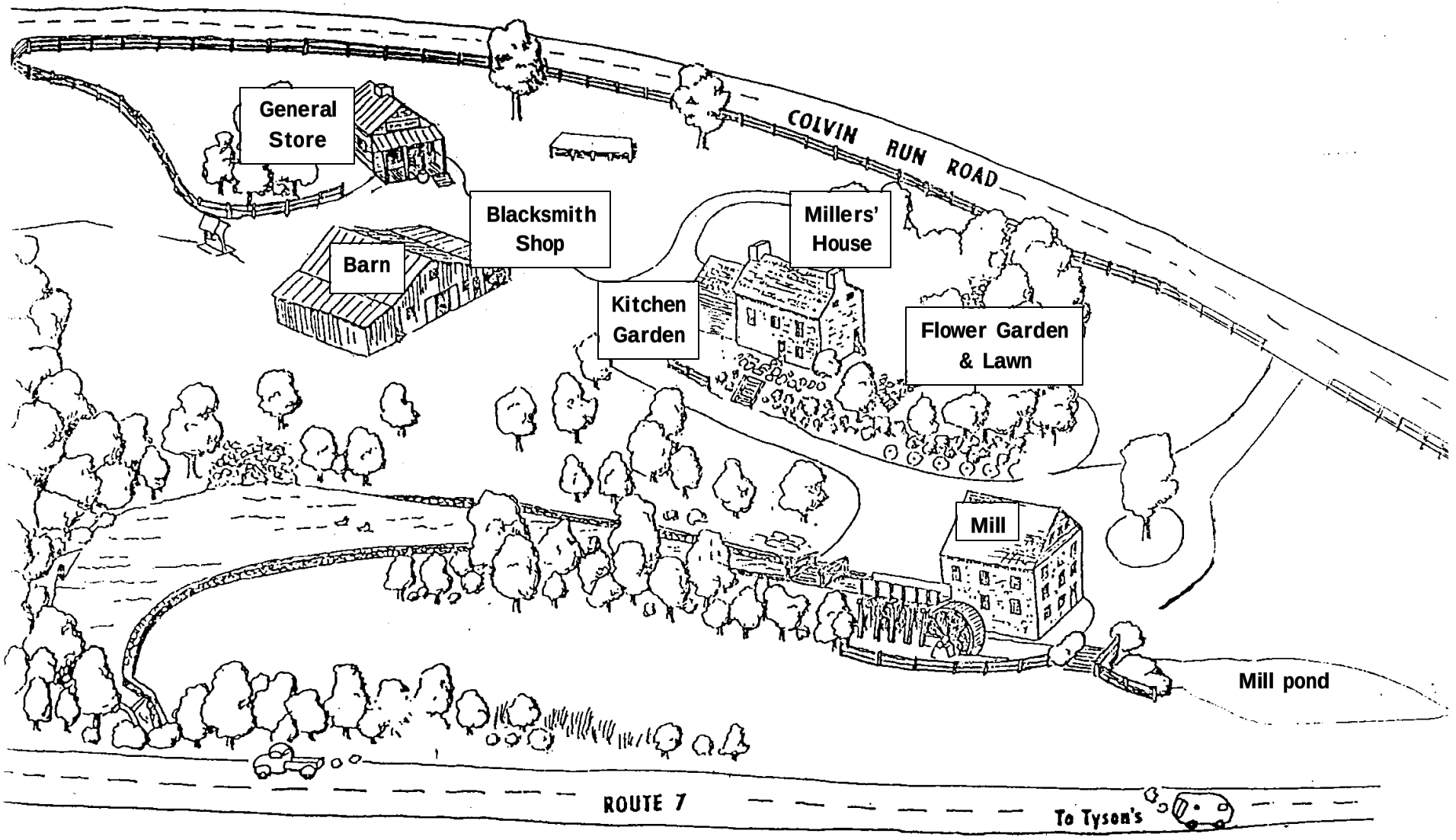
1. Sometimes the storekeeper was also the postmaster. What did the postmaster put in the numbered boxes behind the counter in the General Store? _____
2. 100 years ago, people in Colvin Run, Virginia, grew many of the fruits and vegetables that they ate. Where would the miller's wife have planted her vegetables?

   _____
3. Where would people go to get their metal tools repaired or to buy new tools and other things made from metal? _____
4. Where would farm families go to buy everything from horse collars to penny candy?

   _____
5. Where did the miller live? _____
6. The miller grinds wheat and corn to make flour and cornmeal. What does he use to grind grain in Colvin Run Mill? _____
7. Besides grinding flour and cornmeal for people, the miller also ground coarse feed for animals. Where can you find ducks and geese that like to eat grain ground at the mill?

   _____
8. Croquet was a popular game long ago. Where might the miller's children have played this lawn game? _____

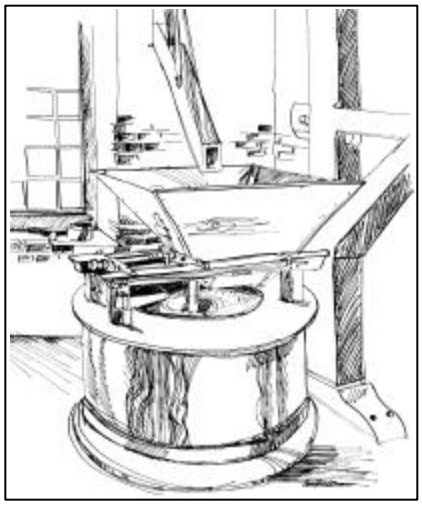
History Hunt
Colvin Run Mill Historic Site



Writing Exercises

Teacher's Note: The following writing exercises may be used to reinforce concepts learned during your visit to Colvin Run Mill.

The Mill:

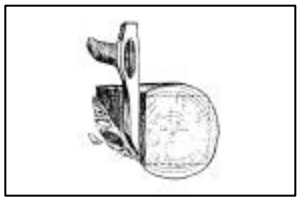


Imagine you were the miller at Colvin Run Mill. Describe what you would have done during your workday. Here are some questions you may answer:

1. How did you make the waterwheel and gears move?
2. What kind of energy did you use to power Colvin Run Mill?
3. Where did you get the grain you ground into flour?
4. What kinds of grain did you grind in the mill?
5. How did you grind the grain into flour or meal?

The Barn:

Pretend you were a miller looking for a place to build a new gristmill. Of all the places you could have picked, you chose Colvin Run, Virginia. Here are some questions you may answer:



1. Why did you choose Colvin Run as the place to build your mill?
2. What tools did you use to build your mill?
3. How did you use them?
4. What kind of energy did you use to power your mill?

The General Store:

Pretend you were the storekeeper at Colvin Run General Store. Describe what you would have done during your workday. Here are some questions you may answer:

1. What was a general store?
2. What did you sell in your store?
3. Who were your customers? What did they do for a living?
4. Where was the post office in the Colvin Run community?
5. How was your store heated in the winter?
6. Without television or radio, how did people in your community learn about the news?

Vocabulary List

* denotes an example of, or something that includes, a simple machine

1. ***Axe.** A hand tool used for felling trees and cutting and shaping wood.

2. ***Beam scale.** A device used by the miller to weigh grain.

3. ***Brace and bit.** A hand-powered tool used to drill holes in wood.

4. **Blacksmith.** A person who makes tools, household items and other things from iron. The blacksmith heats the iron in a fire and hammers it into shape on an anvil.

5. ***Broad axe.** A hand tool used to shape round logs into square beams.

6. **Community.** A group of people with common interests, especially those living in the same area.

7. ***Draw knife.** A two-handled knife used while seated on a shaving horse to shape wood into tool handles, barrel staves and wheel spokes.

8. **Dusty.** The miller's helper or apprentice, so called because he was often covered in flour dust.

9. **Flour.** The product made by grinding wheat.

10. **Flume.** The wooden trough that carries water from the mill race to the waterwheel.

11. ***Froe.** A knife-type wedge used to split wood to make shingles or barrel staves.

12. ***Foot adze.** A cutting tool used to square off round logs to be used for building.

13. ***Gear.** A wheel with teeth or rods made to fit together with other gears so that one gear's turning causes the other gear to turn.

14. **General store.** A shop, usually found in a small community, that carries a variety of goods including food, tools, medicines and other household necessities.

15. **Grain.** The small hard seed of wheat, corn, rice or oats. Bread and cereals are made from ground grain.

16. ***Grain elevator.** A continuous cloth belt with attached cups that moves grain or flour between floors in the mill.

17. ***Greater face gear.** The largest toothed gear in the mill. It is attached directly to the waterwheel shaft.

18. **Gristmill.** A mill that grinds grain into flour (wheat) or meal (corn).

16. ***Lesser face gear.** The smaller toothed gear that fits together with other gears to turn the grinding stones.

19. **Millstones.** A pair of large round stones between which grain is ground. The turning of the top stone (the cap or runner stone) does the grinding, while the bottom stone (the bed stone) does not move. Falling water and turning gears make the millstones move.

20. **Miller.** The person who operates the mill.

21. **Mill pond.** The pond where water is collected before it enters the mill race.

22. **Mill race.** The channel that carries water from the mill pond to the waterwheel and returns it to the stream after the water passes over the waterwheel and powers the mill.

23. ***Overshot wheel.** A type of waterwheel that moves when water is dropped down on it from above. The water fills the buckets and the weight of the water causes the wheel to turn.

24. **Pot-bellied stove.** A coal or wood-burning stove with a rounded body used for heating and/or cooking.

25. **Putlog holes.** Small holes built into a brick wall. Logs put into these holes support a scaffolding for building or repairing the wall.

26. ***Stone crane.** A device used to lift the top mill stone. Using the stone crane, the miller can lift a one-ton mill stone alone.

27. ***Trundle gear.** A birdcage-shaped gear with round rods instead of teeth that fit together with other gears to turn the mill stones.

26. ***Waterwheel.** A large wheel made to be turned by moving water. A waterwheel powers Colvin Run Mill.